

## Claim Listing

1. (Currently Amended) A method of constructing a grid for use in aligning two or more images, where said images reflect corresponding arrays of signals from (i) an array of encoded beads, such that an encoding signal reflects the encoding of the beads, or (ii) the array of encoded beads have particular ligands attached to particular beads, and wherein the ligands attached to beads are identifiable by the encoding and wherein particular ligands are capable of binding to particular targets, and wherein following binding to targets an assay signal is associated with those beads which have attached ligands bound to targets, comprising:  
applying an algorithm to the array which finds the shortest paths among the local intensity minima so as to delineate the local intensity maximum associated with a signal in the array and thereby define a grid as an optimal path as follows:  
computing an external gradient image by subtracting a dilated image from an original image of the signals;  
determining overall orientation by: (i) establishing horizontal and vertical reference lines, (ii) computing the shortest paths along two directions, (iii) computing a ratio by dividing each shortest path length by the length of the corresponding reference line;  
and (iv) selecting the reference line yielding the ratio closest to unity to determine the overall orientation;  
finding the horizontal grid partition by shifting the reference line by one grid unit to a new position and computing the shortest path, and continuing said shifting and computing until the shifted reference line falls outside the array boundary;  
finding the vertical grid partition by finding the shortest path along a diagonal direction, and computing intersections of this diagonal path and every horizontal partition, provided that, given the intersections of the diagonal partition and two consecutive horizontal partitions, the vertical partition will be located at the midpoint of these intersections; and  
using the grid to differentiate individual assay signals or individual encoding signals so as to identify which ligands bound to targets.

2. (canceled).
3. (Previously Presented) The method of claim 1 wherein the algorithm is Dijkstra's "shortest path" algorithm.
4. ( canceled)
5. (Currently Amended) The method of any of claims 1 ~~to 4~~ or 3 wherein following construction of the grid, the grid is grown or shrunk to the expected array boundary.
6. (Previously Presented) The method of claim 5 wherein grid stagger is corrected.
7. (Currently Amended) The method of any of claims 1 ~~to 4~~ or 3 wherein the grid coordinates are stored in a file.
8. (Previously Presented) The method of claims 1 ~~to 4~~ or 3 wherein the algorithm is applied by a programmed computer.